

## Complete Summary

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### GUIDELINE TITLE

Hypertension.

### BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Hypertension. Singapore: Singapore Ministry of Health; 2000 Dec. 42 p. [21 references]

## COMPLETE SUMMARY CONTENT

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## SCOPE

### DISEASE/CONDITION(S)

Hypertension

### GUIDELINE CATEGORY

Diagnosis  
 Evaluation  
 Management  
 Risk Assessment  
 Treatment

### CLINICAL SPECIALTY

Cardiology  
 Family Practice  
 Internal Medicine  
 Preventive Medicine

### INTENDED USERS

Advanced Practice Nurses  
Allied Health Personnel  
Nurses  
Physician Assistants  
Physicians

#### GUIDELINE OBJECTIVE(S)

To assist physicians in clinical decision-making by providing well-balanced information on the management of patients with hypertension, without restricting the physician's individual judgment

#### TARGET POPULATION

Adults aged 18 years and over with hypertension

#### INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis and clinical assessment

1. Blood pressure measurement using mercury sphygmomanometer and other noninvasive measuring devices
2. Home or ambulatory blood pressure monitoring in defined situations
3. Grading of hypertension according to systolic and diastolic blood pressure
4. Clinical evaluation, including clinical and family history; physical examination; laboratory investigations such as urinalysis for blood, protein, glucose, and microscopy; blood chemistry for electrolytes, creatinine, urea, fasting glucose and lipids; and electrocardiography; additional investigations (as indicated); limited echocardiography
5. Assessment of risk factors, target organ damage, and concomitant diseases (e.g., diabetes, cardiovascular or renal disease)

Management

1. Assessment of overall risk profile as guide to management
2. Life style modifications and non-pharmacological therapy, such as smoking cessation, weight reduction, moderation of alcohol consumption, restriction of salt intake, maintenance of adequate intake of dietary potassium, calcium, and magnesium, and increased physical activity
3. Patient education on blood pressure and hypertension, risks involved and prognosis, target blood pressure level, expected benefits as well as the risks and side effects of treatment, and lifestyle modification
4. Antihypertensive drugs (monotherapy or combination therapy), such as diuretics, beta-blockers, angiotensin converting enzyme inhibitors, calcium channel blockers, alpha-blockers, and angiotensin II receptor antagonists
5. Follow-up to monitor blood pressure and other risk factors
6. Cholesterol lowering and antiplatelet therapy (aspirin, ticlopidine) in patients with concomitant risk factors and increased cardiovascular risk

#### MAJOR OUTCOMES CONSIDERED

- Morbidity and mortality due to hypertension
- Achievement of target blood pressure levels
- Incidence of major fatal or non-fatal cardiovascular events (e.g., myocardial infarction and stroke)

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

### NUMBER OF SOURCE DOCUMENTS

Not stated

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level A: Data derived from multiple randomised clinical trials involving large numbers of individuals.

Level B: Data derived from a limited number of trials involving comparatively small numbers of patients or from well-conceived data analyses of nonrandomised studies or observational data registries.

Level C: Consensus opinion of experts was the primary source of recommendation.

### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

American College of Cardiology/American Heart Association classification of recommendations for a diagnostic procedure, a particular therapy, or an intervention:

Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful and effective.

Class II: Conditions for which there is conflict of evidence and/ or a divergence of opinion about usefulness/efficacy of procedure or treatment.

Class IIa: Weight of evidence/ opinion is in favour of usefulness/efficacy.

Class IIb: Usefulness/efficacy is less well established by evidence/ opinion.

Class III: Conditions for which there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful.

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Not stated

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Each recommendation is rated based on the level of the evidence and the classification of recommendations. Definitions of the classification of recommendations for a diagnostic procedure, a particular therapy, of an intervention (Class I, II, IIa, IIb, III) and level of the evidence (Level A - Level C) are presented at the end of the Major Recommendations field.

Note: In addition to the recommendations listed below, the guideline also contains recommendations for treatment of hypertension in patients with type 2 diabetes (Annex 1 of the original guideline) and treatment of hypertension during pregnancy (Annex 2 of the original guideline).

I - Grade hypertension according to systolic and diastolic blood pressure levels. (Class I, Level A) (See Table 2 in the original guideline document for definition and classification of blood pressure levels for adults aged 18 years and older.)

I - Evaluate hypertension to confirm diagnosis, identify secondary causes of hypertension, determine presence and severity of target organ damage and search for risk factors that influence prognosis. (Class I, Level A) (See Table 3 in the original guideline document for factors influencing progress of cardiovascular disease.)

I - Assess overall risk profile as a guide to management of hypertension. (See Risk Stratification and Treatment Plan, below.) (Class I, Level A)

I - Institute immediate antihypertensive drug treatment in high-risk and very high-risk groups. (Class I, Level B)

I - Institute lifestyle modifications and non-pharmacological measures in all hypertensive persons. (Class I, Level B)

I - Optimal blood pressure treatment target levels are <130/< 85 mmHg in young, middle age or diabetic subjects and <140/< 90 mmHg in elderly subjects. (Class I, Level A)

I - Use appropriate drug combinations to achieve target blood pressure levels if this cannot be achieved by one single antihypertensive agent (Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure, 1997). (Class I, Level A)

I - Use long-acting antihypertensive drugs providing 24-hour efficacy (Parati et al., 1987; Frattola et al., 1993). (Class I, Level B)

I - Take into consideration the cost of the drug and any compelling indications and contraindications for its use when prescribing antihypertensive agents. (Class I, Level A)

(See Table 5 in the original guideline document for guidelines for selecting drug treatment of hypertension.)

IIa - Of the six main classes of antihypertensive agents currently available, diuretics and beta- blockers have the best evidence of effectiveness. (Class IIa, Level A)

I - Consider the use of other drugs that reduce cardiovascular risk, such as lipid lowering agents and antiplatelet agents, in patients with concomitant risk factors and increased cardiovascular risk. (Class I, Level A)

#### Risk Stratification and Treatment Plan

Blood Pressure Category (mm Hg)	Risk Group A (No risk factors; no target organ damage/associated clinical condition)	Risk Group B (1-2 risk factors not including diabetes; no	Risk Group C (3 or more risk factors, or diabetes, or target organ damage/associated
		diabetes; no	

		target organ damage. associated clinical conditions)	clinical conditions)
Grade 1 (Mild hypertension) Systolic blood pressure 140-159 or diastolic blood pressure 90-99	Lifestyle modifications 6-12 months	Lifestyle modifications 3-6 months	Lifestyle modifications and begin drug therapy
Grade 2 (Moderate hypertension) Systolic blood pressure 160-179 or diastolic blood pressure 100-109	Lifestyle modifications 3-6 months	Lifestyle modifications 3-6 months	Lifestyle modifications and begin drug therapy
Grade 3 (Severe hypertension) Systolic blood pressure $\geq 180$ or diastolic blood pressure $\geq 110$	Lifestyle modifications and begin drug therapy	Lifestyle modifications and begin drug therapy	Lifestyle modifications and begin drug therapy

#### Levels of Evidence

Level A: Data derived from multiple randomised clinical trials involving large numbers of individuals.

Level B: Data derived from a limited number of trials involving comparatively small numbers of patients or from well-conceived data analyses of nonrandomised studies or observational data registries.

Level C: Consensus opinion of experts was the primary source of recommendation.

Classification of Recommendations for a Diagnostic Procedure, a Particular Therapy, or an Intervention

Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful and effective.

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#### CLINICAL ALGORITHM(S)

The original guideline contains a clinical algorithm for the initiation of antihypertensive therapy and follow-up.

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

### BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

#### POTENTIAL BENEFITS

The randomised trials conducted to date have shown clear evidence of a lower incidence of major cardiovascular disease events after high blood pressure was treated with antihypertensive drugs. There is as yet no evidence that the main benefit of treating hypertension is due to a particular drug property rather than to lowering blood pressure per se.

From the results of randomised controlled trials, it appears that each reduction of 10 to 14 mmHg in systolic blood pressure and 5 to 6 mmHg in diastolic blood pressure confers about two fifths reduction in stroke, one-sixth reduction in coronary heart disease and, in Western populations, one-third reduction in major cardiovascular events overall.

There are no data which suggest that this effect of lowering blood pressure is significantly different in Asian populations.

In patients with Grade 1 hypertension, monotherapy with most agents will produce reductions in systolic/diastolic blood pressure of about 10/5 mmHg. In patients with higher grades of hypertension, it is possible to achieve sustained blood pressure reductions of 20/10 mmHg or more, particularly if combination drug therapy is used.

The 1999 World Health Organization/Internal Society of Hypertension guidelines estimated the absolute effects of such blood pressure reductions on cardiovascular disease risks (fatal plus nonfatal stroke or myocardial infarction) (See Table 6 in original guidelines). The estimated absolute treatment benefits will range from less than 5 events prevented per thousand patient years of treatment (low risk) to more than 17 events prevented per thousand patient years of treatment (very high risk).

The absolute benefits for stroke and coronary heart disease will be augmented by smaller absolute benefits for congestive heart failure and renal disease.

These estimates of benefits are based on relative risk reductions observed in trials of about 5 years duration. Long- term treatment over decades could produce large risk reductions.

#### POTENTIAL HARMS

- Antihypertensive drugs can cause side effects
- Atenolol is associated with foetal growth retardation when used long term throughout pregnancy
- Angiotensin II antagonists and angiotensin-converting enzyme inhibitors are associated with possible foetal adverse effects

### CONTRAINDICATIONS

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The following contraindications (compelling and possible) are listed for the various antihypertensive drug classes:

Diuretics. Compelling: gout; Possible: dyslipidemia, sexually active males. Diuretics are used infrequently during pregnancy because of concerns of reduction of the already compromised plasma volume.

Beta-blockers. Compelling: asthma and chronic obstructive pulmonary disease (COPD), grade 2 or 3 atrioventricular block; Possible: dyslipidemia, athletes and physically active patients, vascular disease

Angiotensin Converting Enzyme (ACE) Inhibitors. Compelling: pregnancy, bilateral renal artery stenosis, hyperkalemia

Calcium Channel Blockers. Compelling: Grade 2 or 3 atrioventricular block with verapamil or diltiazem; Possible: congestive heart failure with verapamil or diltiazem.



Alpha-blockers. Possible: orthostatic hypotension

Angiotensin II Receptor Antagonists. Compelling: pregnancy, bilateral renal artery stenosis, hyperkalaemia

## QUALIFYING STATEMENTS

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These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.

The contents of the guideline document are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

These guidelines do not address the problem of hypertensive emergencies, such as hypertensive cerebral haemorrhage, which are better managed in specialized facilities by the appropriate specialists.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

#### Quality Indicators for Hypertension Management

The target blood pressure treatment levels are:

- Blood pressure <130/<85 mmHg in young, middle-aged or diabetic patients
- Blood pressure <140/<90 mmHg in elderly patients

#### Process Indicators and Recommended Frequency

1. Goal blood pressure as stated above achieved, measured by risk level is recommended to be reviewed at the following frequency:
  - Normal risk: annually
  - Low and medium risk: 6 monthly
  - High and very high risk: 3 monthly
2. The following performance measures are recommended to be reviewed annually or more frequently according to individual risk factor profile:
  - Weight
  - Fasting blood glucose
  - Fasting lipid profile
  - Serum electrolyte, urea and creatinine

- Urinalysis
- 3. An electrocardiogram is recommended annually or more frequently according to cardiac status.
- 4. Patient education is recommended at diagnosis and regular intervals according to risk level.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Living with Illness  
Staying Healthy

### IOM DOMAIN

Effectiveness  
Patient-centeredness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Hypertension. Singapore: Singapore Ministry of Health; 2000 Dec. 42 p. [21 references]

### ADAPTATION

These guidelines provide recommendations that were adapted from other international guidelines on hypertension and modified to suit the local situation. International guidelines used as references include the 1999 World Health Organization - International Society of Hypertension Guidelines (The Guidelines Subcommittee of the World Health Organisation--International Society of Hypertension [WHO-ISH] Mild Hypertension Liaison Committee: 1999 WHO-ISH guidelines for the management of hypertension. *J Hypertens* 1999;17:151-83), the U.S. Joint National Committee VI Report (Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The sixth report of the Joint National Committee on Prevention, Detection and Treatment of High Blood Pressure [JNC VI]. *Arch Intern Med* 1997;157:2413-46), and the 1999 British Hypertension Society Guidelines (Ramsay LE, Williams B, Johnson DG, et al. Guidelines for management of hypertension: report of the Third Working Party of the British Hypertension Society, 1999. *J Hum Hypertens* 1999;13:569-92).

### DATE RELEASED

2000 Dec

### GUIDELINE DEVELOPER(S)

National Committee on Cardiac Care (Singapore) - National Government Agency [Non-U.S.]  
National Medical Research Council (Singapore Ministry of Health) - National Government Agency [Non-U.S.]  
Singapore Cardiac Society - Medical Specialty Society  
Singapore Ministry of Health - National Government Agency [Non-U.S.]

#### GUIDELINE DEVELOPER COMMENT

These guidelines on hypertension have been developed by a workgroup appointed by the Joint Cardiovascular Working Committee of the Singapore National Committee on Cardiac Care and the Singapore Cardiac Society.

#### SOURCE(S) OF FUNDING

Singapore Ministry of Health

#### GUIDELINE COMMITTEE

A workgroup appointed by the Joint Cardiovascular Working Committee of the Singapore National Committee on Cardiac Care and the Singapore Cardiac Society.

#### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Workgroup members: Dr. Low Lip Ping (Chairperson); Dr. Baldev Singh; Dr. Chee Tek Siong; Dr. Christopher Chew; Dr. Amy Ng; Dr. Melvin Tan; Dr. Akira Wu; Dr. Ong Pang Yeow (Secretariat); Dr. Loh Yik Hin (Secretariat)

#### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

#### GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

#### GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Singapore Ministry of Health Web site](#).

Print copies: Available from the Singapore Ministry of Health, College of Medicine Building, Mezzanine Floor 16 College Rd, Singapore 169854.

#### AVAILABILITY OF COMPANION DOCUMENTS

None available

## PATIENT RESOURCES

None available

## NGC STATUS

This summary was completed by ECRI on October 25, 2001. The information was verified by the guideline developer on November 16, 2001.

## COPYRIGHT STATEMENT

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions. Please contact the Ministry of Health, Singapore by e-mail at [MOH\\_INFO@MOH.GOV.SG](mailto:MOH_INFO@MOH.GOV.SG).

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